Claims

1. Device for producing lines (6, 7) or groups (5) of lines of electromagnetic radiation of the optical spectral range in a preselectable three-dimensional area, and the lines (6, 7) or groups (5) of lines can be used as positioning aids or geometry detection aids, comprising at least one conversion unit (1) which is at least partially transparent to the electromagnetic radiation used and which can convert the electromagnetic radiation passing through it, especially coherent radiation or laser radiation, such that the electromagnetic radiation forms at least one line (6, 7) or group (5) of lines in a given three-dimensional area, characterized in that the conversion unit (1) comprises at least one refractive element (2), by refraction of the radiation passing though the conversion unit (1) on at least one optically functional interface (3) of the refractive element (2) at least one line (6, 7) or group (5) of lines being formed in a given three-dimensional area.

2. Device as claimed in claim 1, wherein the optically functional interface (3) of at least one refractive element (2) has a freely selectable configuration which is suitable for the lines (6, 7) or groups (5) of lines to be produced.

3. Device as claimed in one of claims 1 or 2, wherein the optically functional interface (3) of at least one refractive element (2) is divided into segments (4).

4. Device as claimed in claim 3, wherein the segments (4) have the same size and have preferably an identical shape.

5. Device as claimed in one of claims 3 or 4, wherein the individual segments (4) have a cylinder lens geometry, there being preferably two groups of segments (4) with cylinder axes of cylinder geometry, the axes being perpendicular to one another.

6. Device as claimed in claim 5, wherein the cylinder lens geometry of the individual segments (4) is a spherical or an aspherical cylinder lens geometry.

7. Device as claimed in claim 1 to 6, wherein the generated lines (6, 7) can be straight or curved lines.

8. Device as claimed in one of claims 1 to 7, wherein the generated groups (5) of lines can be crosses, triangles, polygons, grids or the like, and the lines (6, 7) which form the individual groups (5) of lines can be on top of one another at a right angle or at an angle which differs from a right angle.

9. Device as claimed in one of claims 1 to 8, wherein the generated lines (6, 7) or the generated groups (5) of lines are curved such that they image a planar structure, especially a

planar orthogonal grid, when they encounter the curved surface of a workpiece in a given three-dimension area on the latter.

10. Device as claimed in one of claims 1 to 9, wherein the device comprises a source for producing the electromagnetic radiation, especially a laser light source.

11. Robots for machining of workpieces comprising a device as claimed in one of claims 1 to 10.